REMARKS

Claims 1-9, 11-86, 88-94, and 105 are pending in the present application. The Examiner has rejected claims 1-9, 11-86, 88-94 and 105 under 35 U.S.C. §103(a). Applicant has amended claims 1, 49, and 105. No new matter has been added.

Section 103 Rejections

Claims 1-9, 11-29, 33-35, 37-42, 45, 47, 49-51, 53, 55, 58-80, 84-85, 87-92, and 105 were rejected under 35 U.S.C. §103(a) as being obvious over Abreu, *et al.*, "Video-Based Multi-Agent Traffic Surveillance System", Proceedings of the IEEE 2000 Intelligent Vehicles Conference, 4-5 October 2000, pgs. 457-462 (hereinafter VM), in view of U.S. Patent Application Publication No. 2007/0154067 (Laumeyer, *et al.*).

Claims 30-32, 46, 48, 52, 54, and 81-83 were rejected under 35 U.S.C. §103(a) as being obvious over VM.

Applicant urges that at the very least, the combination of VM and Laumeyer fails to disclose or suggest Applicant's *method for detecting one or more objects belonging to the same object class . . . wherein said method is adapted for detecting moving and stationary objects from a moving video camera,* as essentially recited in claims 1, 49, and 105.

VM is directed to a video-based traffic surveillance system using stationary cameras placed along a highway. In VM, the area being monitored remains the same and thus VM deals with a static background scene of the same area. Applicant's method is *adapted for detecting moving and stationary objects from a moving video camera.* As discussed in Applicant's responses submitted on December 6, 2007, and April 18, 2008, VM uses a change detector to detect moving objects (e.g. vehicles) from a background scene. A change detector cannot be used with a moving camera, because the background is not static, as the image scenes captured by the camera are continuously changing. Applicant's method uses a classifier to determine if a vehicle is detected from a moving

video camera. The Examiner acknowledged that VM fails to teach a method adapted for use with a moving video camera, but then cites Laumeyer as disclosing this limitation.

Laumeyer is directed to the identification of objects depicted in one or more image frames of a video stream. In particular, Laumeyer discloses building a database of road signs by processing images of roadside scenes obtained from a moving vehicle. The Examiner alleged that Laumeyer further discloses detecting pedestrians in a video stream, and that pedestrians are moving objects.

Applicant respectfully disagrees with the Examiner. Laumeyer's disclosure is directed to describing how road signs can be recognized in a video stream using rules regarding their appearance (pp. [0059]). The only reference to a pedestrian in Laumeyer's disclosure is a sentence in pp. [0059], "Furthermore, pedestrian, cycle, and RV path signage identification may likewise benefit from the present invention." There is no disclosure in Laumeyer of how pedestrians, cycles, and RV path signs would be recognized, given the differences in appearance from road signs, thus Applicant urges that this sentence is not enabling for the identification of pedestrians. In addition, this sentence does not indicate whether the pedestrians are moving or stationary. The rest of Laumeyer's disclosure concerns the detection of stationary signs, and does not enable the detection of moving objects. Furthermore, this sentence could also be interpreted as not referring to the detection of pedestrians, cycles, and RV path signs at all, but to detecting signs for pedestrians, cycles, and RV paths. This interpretation is enabled by Laumeyer's disclosure. Thus, Applicant urges that Laumeyer does not disclose a method *adapted for detecting moving and stationary objects from a moving video camera*, as recited in claims 1, 49, and 105.

Further regarding claim 1, the Examiner alleged that VM's disclosure of matching an observed mobile object size with previously gathered information of typical object sizes (pg. 459, left column, lines 26-29) teaches Applicant's *classifiers for detecting components at multiple scales.*

Applicant respectfully disagrees.

VM uses size information only for determining the object type of a whole moving target (pg. 459, left column, lines 26-29). This size information is incorporated in class templates that are updated with typical sizes for each class of a mobile object, such as a car, truck, motorbike, person, etc., (pg. 459, left column, lines 30-36). However, VM does not address detecting object components of different sizes, using *classifiers for detecting components at multiple scales,* as essentially recited in claim 1.

Regarding claim 49, the Examiner alleged that VM teaches accumulating confidence scores across multiple frames, alleging that since VM tracks a detected object through video, there must be multiple frames wherein the confidence score is calculated.

Applicant respectfully disagrees.

First, as noted above, since VM is directed to a video-based traffic surveillance system using stationary cameras placed along a highway, a stationary camera cannot track a detected object as a moving object will eventually pass out of the view of a stationary camera. The tracking performed by VM consists of matching a description of an object observed with one camera with an object description observed with a second camera (pg. 459, right column, lines14-31). VM does not, and cannot, disclose a single moving cameras tracking a moving object, as recited in Applicant's claims 1, 49, and 105. Furthermore, the section of VM cited by the Examiner as disclosing this limitation, pg. 459, left column, lines 15-17, only discloses that each classification has a confidence factor in the range [0, ..., 1], where 0 means no-confidence, and 1 means maximum confidence. There is nothing in this statement regarding factor ranges that implies accumulating confidence scores across multiple frames. The Examiner's statement that "there must be multiple frames wherein the confidence score is calculated" is an assumption that is unsupported by VM's disclosure. Although VM does disclose accumulating scores acquired from different classifiers, VM does not disclose inferring accumulating confidence scores across multiple frames, as essentially recited in claim 49.

Regarding claim 105, the Examiner cites Laumeyer's disclosure of classifying an object based on color and shape as disclosing the claim 105 limitation that *the one or more classifiers include overlapping component classifiers.*

Applicant respectfully disagrees with this interpretation of Laumeyer.

First, Laumeyer nowhere discloses the use of classifiers to identify signs in video streams, but rather uses subjectively defined image features and image filters to segment objects. For example, paragraph [0016] states:

> Thus, the present invention transforms frames of digital video depicting roadside scenes using a set of filters that are logically combined together with OR gates or combined algorithmically and each output is equally weighted, and that each operate quickly to capture a differentiable characteristic of one or more road sign of interest. Frequency and spatial domain transformation, edge domain transformation (Hough space), color transformation typically from a 24 bit RGB color space to either a L*u*v* or LCH color space (using either fuzzy color set tuning or neural network tuning for objects displaying a differentiable color set), in addition to use of morphology (erosion/dilation), and a moment calculation applied to a previously segmented image frame is used to determine whether an area of interest that contains an object is actually a road sign. The aspect ratio and size of a potential object of interest (an "image" herein) can be used to confirm that an object is very likely a road sign. If none of the filters produces an output signal greater than a noise level signal, that particular image frame is immediately discarded.

All of the features mentioned in this paragraph, such as frequency and spatial domain transformation, edge domain transformation, color transformation aspect ratio, were pre-selected by the inventors to perform classification. There is no reference in this paragraph to classifiers trained to automatically select the most discriminative features of the objects being detected and using these discriminative features to detect the object. Further examples of Laumeyer's rule based approach to sign classification can be found in the examples, paragraphs [0063] to [0087], all of which use preselected features to perform the classification, not classifiers trained through boosting to learn discriminative features and decision rules. Since Laumeyer does not disclose classifiers, Laumeyer cannot disclose overlapping component classifiers, since one derives from the other.

What the Examiner characterizes as "overlapping component classifiers" is in fact just two different rules using presented features.

Since the combination of VM and Laumeyer fails to disclose or suggest all of the limitations of independent claims 1, 49, and 105, these claims are not obvious VM and Laumeyer. Reconsideration and withdrawal of these rejections are respectfully requested.

Claims 2-9, 11-35, 37-42, 45-48, 50-55, 58-85, and 87-92, all depend from either claim 1 or claim 49, are patentable for at least the same reasons as claims 1 and 49. Reconsideration and withdrawal of these rejections are respectfully requested.

Claims 36, 43-44, 56-57, 86, and 93-94 were rejected under 35 U.S.C. §103(a) as being obvious over VM in view of U.S. Patent No. 5,761,326 (Brady, *et al.*).

Brady is directed to a machine vision system that acquires images from roadway scenes and processes the images by analyzing the intensities of edge elements within the image. Brady applies fuzzy set theory to the location and angles of each pixel after the pixel intensities have been characterized by vectors. However, Brady does not rectify the deficiencies of VM and Laumeyer, discussed above, and thus Applicant urges that a *prima facie* case of obviousness against claims 36, 43-44, 56-57, 86, and 93-94 over VM, Laumeyer and Brady cannot be maintained. Reconsideration and withdrawal of these rejections are respectfully requested.

CONCLUSION

Applicant urges that claims 1-9, 11-86, 88-94, and 105, as amended, are in condition for allowance for at least the reasons stated. Early and favorable action on this case is respectfully requested.

Respectfully submitted,

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